Chapter 4 Construction Effects and Mitigation

Construction effects are temporary effects on people and the environment that occur during construction. This chapter describes how and when construction of the proposed action will occur (Questions 1 through 6), the temporary impacts that may occur during construction (Questions 7 through 20), and measures to mitigate these impacts (Questions 21 through 25). Under the No Action Alternative, construction will not occur; thus, no temporary impacts will occur.

Construction Techniques

1 When is construction of the proposed action going to start and how long will it take?

Construction of the proposed action is currently scheduled to begin in the summer of 2010 and be completed in 2013. Construction is expected to take approximately 36 months.

2 How will the proposed action be constructed?

Before major construction activities on SR 522 begin, the project will:

- Install high-visibility construction fencing to mark sensitive areas (streams, wetlands, and their buffers) located within the project limits.
- Install appropriate temporary erosion and sediment control (TESC) measures in work areas prior to beginning construction activities. The TESC measures will be monitored for effectiveness throughout construction.

- Construct temporary access roads and a temporary access work trestle on the east side of the Snohomish River to allow access for bridge construction. Vegetation will be cleared to build the temporary access roads.

The following construction activities will be necessary to widen SR 522, build the new Snohomish River Bridge, and create the stormwater facilities:

- Clear and grade several locations, including the new bridge and bridge approach site at the Snohomish River, adjacent to the existing highway to construct the additional travel lanes, and at the two SR 522 interchanges (US 2 and 164th Street SE). WSDOT standard specifications, permit requirements, and weather conditions (dry season or wet season) will limit the amount of clearing and open grading that can occur at any one time. The special provisions of the construction contract will address work limitations.
- Construct permanent stormwater facilities. This work will occur early in the grading process, so the facilities can be used as temporary sedimentation ponds during construction.
- Replace one culvert with a fish-passable culvert and a second culvert with a fish-passable culvert/wildlife crossing structure.
- Construct the new bridge over the Snohomish River. Construction timing will be concurrent with widening of the existing highway and with construction of the interchanges.
- Complete final grading and paving along the newly constructed portions of the alignment and overlay the existing roadway.

The following final construction activities will be needed to complete the project:

- Restore construction access roads, staging areas, and temporary work areas.
- Restore roadside vegetation.

- Complete lane striping and installation of permanent signage, guardrails, and roadway illumination.
- Clean up stormwater facilities used for temporary sedimentation ponds and remove temporary stormwater best management practices (BMPs).

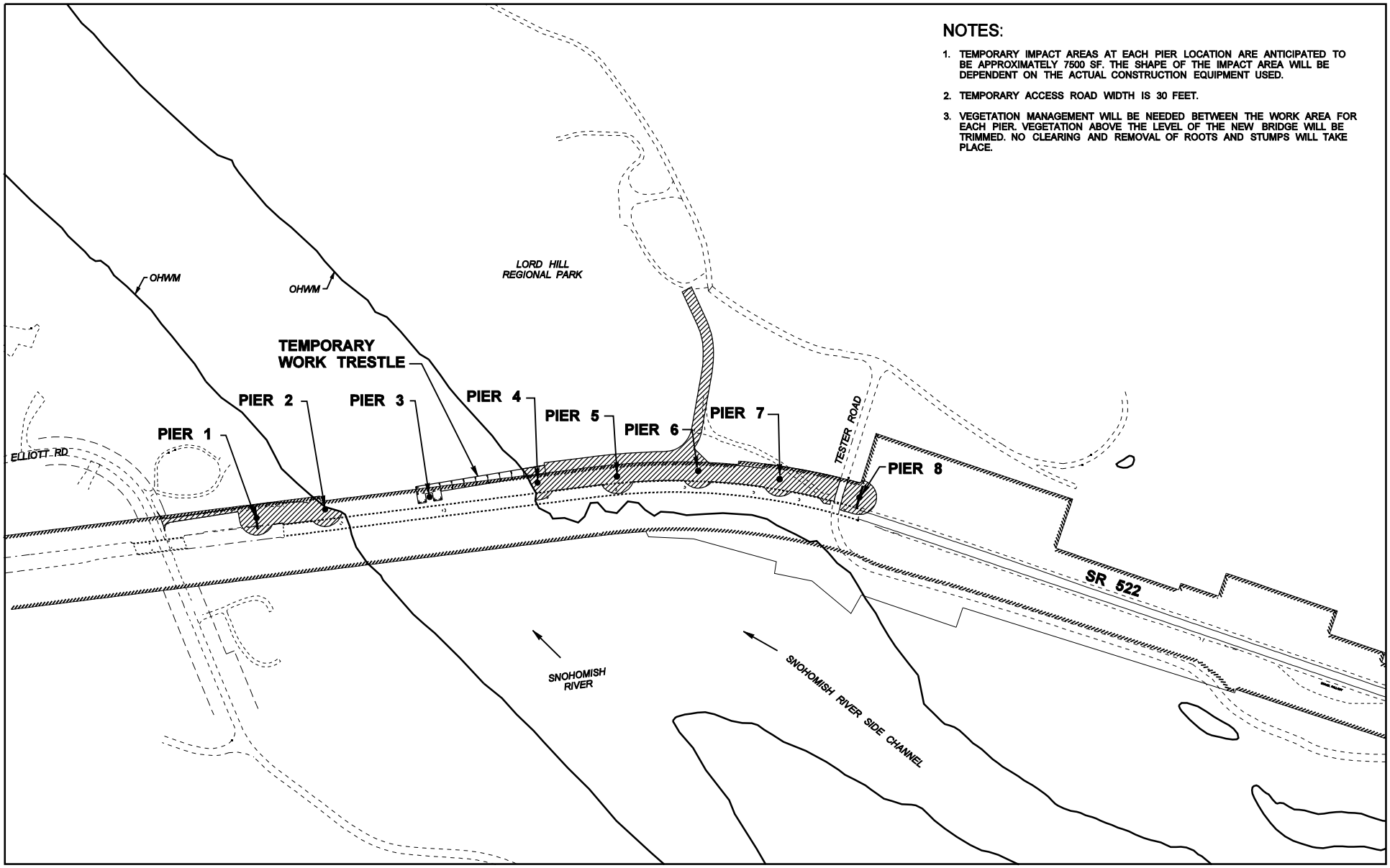
Widening SR 522 will require a substantial amount of earthwork. A preliminary analysis indicates that approximately 140,000 cubic yards of soil will be removed (cut) and approximately 410,000 cubic yards of soil will be required (fill) for the project. In general, the western portion of the proposed alignment will require cuts and fills, while the eastern portion (in the City of Monroe) will require the placement of fill. To the extent feasible, the earthen materials from the cuts will be trucked to use as fill material on the eastern portion. The contractor will haul all excess material that cannot be used as fill off site for disposal in an approved facility.

3 How will the new Snohomish River Bridge be constructed?

To build the temporary work trestle and the new bridge piers for the new bridge over the Snohomish River, WSDOT will first create a temporary access road across the floodplain from Tester Road along the southern edge of Lord Hill Regional Park (Exhibit 4-1). The road will be approximately 30 feet wide and surfaced with quarry spalls or similar stable materials that should not move if the area becomes flooded. During the first in-water work window (July 1 to August 31), the temporary work trestle will be built from the eastern shore of the Snohomish River to the location of the center pier in the middle of the river. A maximum of 135 piles will be placed in the water to support the work trestle, including up to 90 hollow steel piles of 24-inch diameter and 45 angled (battered) piles.

What is a work window?

The work window is the short period of time when in-water construction activities can occur. The window is between early summer (after salmon migrate to the ocean) and early fall (before they swim upstream to spawn).



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Legend:

Approximate Impact Areas

Project Right of Way

Project Limited Access Right of Way

Existing Roads

Exhibit 4-1

Temporary Construction Impacts at the SR 522 Snohomish River Bridge

Workers will install these piles with an impact hammer, as the geotechnical conditions at the site are not conducive to the use of vibratory pile installation (i.e., it is likely that large cobbles and boulders will be encountered).

From the temporary work trestle in the Snohomish River, a single 10-foot-diameter drilled shaft will be constructed to support the center in-water pier of the new bridge. The pier will then be constructed by pouring concrete into a steel casing. Once the concrete pour is completed, the temporary work trestle will be removed by vibrating the steel piles out of both the river channel and floodplain, working backward from the in-water end of the trestle.

During the second in-water work window, the temporary work trestle will be rebuilt to construct the above-water portion of the center pier. At the end of the work window, the temporary work trestle will again be removed and the access area will be restored to its original grade and revegetated with native plants.

The roadway deck and barrier will be constructed using cast-in-place concrete on top of steel girders. The steel girders will be launched from the river banks.

4 How will construction occur through the rock outcrops located east of the Snohomish River?

WSDOT has minimized the amount of rock outcrops that must be blasted through shifts in the highway alignment within the right-of-way. However, WSDOT estimates that construction of the proposed project will require blasting along approximately 2,000 linear feet of SR 522. Blasting will occur at the rock outcrops along SR 522, between milepost (MP) 21.13 and 21.51. It is anticipated that the contractor will blast approximately 200 linear feet of rock at a time. The contractor will drill holes in the rock at intervals of 2.5 feet along the rock face where charges will be placed over the course of several days. Production holes will also be drilled as necessary so that when charges are detonated, the rock will break into small enough pieces for hauling and removal. Charges will then be placed in the holes and detonated. Blasting will take place on

approximately 10 separate days within the 2-month allowable work window. Barriers will be placed to reduce the potential for rocks to enter the roadway. Standby construction equipment will be available in case rock does enter the roadway. Traffic will be stopped at the time of detonation and until any cleanup or repair to the roadway is completed.

The contractor will detonate the linear charges sequentially. The charges will be sized to fracture the rock so that it can be excavated by conventional equipment. Based on the size, number, and placement of the charges, no visible displacement of rock during detonation is anticipated. Although the ground will heave within the blast area during detonation, it will remain in place and will not produce flyrock. Because of the limited nature of the blasting and the topography at the blasting site, blasting mats will not be needed.

What is flyrock?

Flyrock is defined as the fragments of rock thrown and scattered during blasting. The potential for flyrock during blasting cannot be completely eliminated but is managed by careful calculation of explosive sizes and spacings as well as investigation of the existing rock conditions. The adequacy of the proposed blasting plan will be demonstrated by drilling, blasting, and excavating short test sections prior to commencing full-scale blasting operations.

5 Are there seasonal limitations on construction?

With the exception of temporary work trestle removal, the timing of in-water work within the Snohomish River will occur during the fish window between July 1 and August 31, as specified by the Washington Department of Fish and Wildlife (WDFW). In-water work is considered to be installation of the temporary work trestle and the construction of the center pier in the main channel of the Snohomish River. The other piers are outside of the Snohomish River ordinary high water mark. Removal of the temporary work trestle will occur before September 30.

In-water work for culvert replacements on fish-bearing streams will take place during the in-water work window specified in the Hydraulic Project Approval (HPA) issued by WDFW. For planning and scheduling purposes, WSDOT assumes this window will be July 1 to August 31.

WSDOT standard specifications, permit requirements, and weather conditions (dry season or wet season) will limit the amount of clearing and open grading that can occur at any one time.

No pile driving will occur within 1 mile of any active bald eagle nests or during the bald eagle wintering season (October 31 through March 31).

Rock outcrop blasting will occur on approximately 10 separate days in September and October. This is outside both the breeding season (January 1 through August 15) and the wintering season (October 31 through March 31) for bald eagles, reducing the potential for disturbance to eagles during these sensitive periods. If rock from the blasting is crushed on site, this activity will occur during the same 2-month window.

6 What best management practices will be implemented during construction?

WSDOT will require the contractor to implement BMPs to reduce erosion and sedimentation and to prevent debris or contaminants from entering project waters. The selection of BMPs will be based on permitting requirements, but BMPs may include the following measures:

- Define construction limits clearly with stakes prior to the beginning of ground-disturbing activities, and prohibit disturbance beyond these limits.
- Prohibit construction equipment from entering the ordinary high water mark of project area streams, except where allowed by a permit.
- Locate staging and stockpile areas away from streams and wetlands.
- Use mulching, matting, and netting; filter fabric fencing; quarry rock entrance mats; sediment traps and ponds; temporary stream bypasses; or surface water interceptor swales and ditches.
- Cure concrete sufficiently prior to contact with water to avoid leaching (i.e., prohibit fresh concrete from coming into contact with waters of the State).

- Use bubble curtains or other sound attenuation measures during in-water pile driving to reduce acoustical effects to fish and other aquatic species.
- Schedule excavation and grading work to avoid disturbances during wet winter months.
- Develop a spill containment plan, educate workers about the plan, and have the necessary materials on site prior to and during construction.
- Clean equipment that is used for in-water work prior to operations below the ordinary high water mark, and prevent untreated wash and rinse water from discharging into surface waters.
- Refuel equipment within a designated refueling containment area away from the shoreline, streams, or any designated wetland areas.
- Inspect all vehicles daily for fluid leaks before leaving the vehicle staging area, and repair any leaks before the vehicle resumes operation.

Construction Effects

7 How will construction affect traffic?

Motorists traveling along SR 522, 164th Street SE, or US 2 will experience some disruptions and inconveniences. Construction may require temporary lane or shoulder reductions or closures. WSDOT and its contractor will work together to ensure the maximum access through and around the project area during construction. Lane closures will typically be restricted to nighttime hours, with the exception of closures for rock blasting.

These disruptions and inconveniences are minimized because much of the project can be constructed without major alteration to use of the existing roadway. For example, the new bridge will be constructed adjacent to the existing bridge. WSDOT expects that most, if not all, construction equipment will operate from the temporary work trestle or the shoreline areas, rather than from the existing bridge.

From approximately 1 mile northeast of the Snohomish River (near MP 22) to US 2, all widening is to the west of the existing roadway. Thus, the widened roadway can be constructed adjacent to the existing roadway. To widen the remainder of the highway, traffic will be diverted onto the newly built highway. Likewise, when WSDOT overlays the existing highway, westbound traffic will be fully shifted to the new portion of the highway, and traffic in the eastbound direction may be reduced to one lane during off-peak hours to perform the work.

What is overlaying?

Putting new pavement on top of the old pavement to provide a smooth, safe driving surface.

In the two locations where culverts will be replaced, the culverts will be constructed in two phases:

- First, the culvert will be built where the highway is widened (the new area).
- Then traffic will be rerouted from the existing highway to the new highway, and the culvert will be constructed through the existing section.

Likewise, the approaches to the new roundabout on 164th Street SE can be constructed without disrupting existing traffic flow. Then traffic can be routed around subsequent construction, using these approaches.

The amount of construction truck traffic will be substantial due to the amount of earthwork. Construction traffic will access most work areas from the existing highway, eliminating impacts to local streets except near the Snohomish River Bridge. To access the Snohomish River Bridge, construction vehicles will use Tester Road or Cathcart Road. Access from local streets will also be necessary for work in the vicinity of

164th Street SE and the 154th Street SE/179th Avenue SE overcrossing.

Although advance notice will be given for the closures associated with the rock outcrop blasting, this construction activity will cause some traffic disruption and delay. SR 522 will be closed to all traffic while the rock outcrop blasting occurs and will not reopen until any cleanup or repair to the roadway is completed. The blasting is expected to take place in small sections on approximately 10 separate days.

8 How will construction affect pedestrians and bicyclists?

SR 522 is a high-speed, limited access facility. While use of SR 522 by pedestrians and bicyclists is not prohibited, it is also not encouraged. Construction activities within the SR 522 right-of-way should have minimal effects on pedestrians and bicyclists.

On the other hand, construction activities will likely require the temporary closure or rerouting of sidewalks along US 2 and 164th Street SE. Pedestrian access along the south side of US 2 will be restricted during widening work. Likewise, detours will be necessary for pedestrian traffic along 164th Street SE.

Finally, pedestrians and bicyclists may encounter minor shoulder restrictions at Cathcart Road as well as at 154th Street SE and 179th Avenue SE for bridge construction.

9 How will the construction affect noise levels?

During construction of the SR 522 project, noise will be generated by heavy equipment. Construction activities will occur throughout the project area and may be as close as 50 feet from existing structures. Estimates of maximum hourly noise levels at the closest receivers for various stages of construction are provided in Exhibit 4-2. Other noise-generating construction activities may include drilling holes in the rock cut areas, installing shoring, drilling shafts for bridges, and crushing rock.

Exhibit 4-2
Estimated Peak Hour Construction Noise Levels

Construction Phase	Loudest Equipment or Activity	Maximum Noise Level at 50 feet (dBA L_{max})
Bridge Construction	Pile driving	105
Clearing and grubbing	Bulldozer, backhoe	86
Earthwork	Blasting	105
Foundation	Backhoe, loader	85
Base preparation	Trucks, bulldozer	88
Paving	Paver, trucks	89

Source: U.S. Department of Transportation. Highway Construction Noise: Measurement, Prediction, and Mitigation. 1977.

Offsetting the relatively high noise levels is the fact that the construction in a single location will occur for a short duration, varying from a few days to several months, depending on the construction activity. The levels in Exhibit 4-2 can be expected only when the equipment is within 50 feet of the receiver. All buildings bordering on project roadways can expect maximum construction noise levels in the 80 to 90 dBA range when equipment is operating on the roadway immediately next to them. These noise levels will decrease as the construction operations move farther away.

Although the maximum noise levels in Exhibit 4-2 are relatively high, WSDOT will still meet state noise regulations for construction during daytime hours. However, some nighttime construction is expected (e.g., striping, US 2 grading and paving, girder-setting for the bridges). For nighttime construction activities, WSDOT will likely have to obtain a noise variance from the City of Monroe and Snohomish County.

10 Will construction affect air quality?

During construction, air quality may be affected by dust from excavation or grading and emissions from construction equipment. BMPs such as watering down dusty areas, covering debris and storage piles, using lower-emission fuels, and maintaining construction equipment will be implemented. Construction activities such as clearing and grading, which

contribute to higher dust levels, and paving, which can cause odors, will be temporary.

11 Will construction affect views?

Construction-related activities will temporarily affect the views of SR 522 users and neighbors during construction. Potential temporary effects include:

- Temporary lighting used for nighttime construction and the associated light and glare from this lighting.
- Loss of mature vegetation and exposure to soils in the 5 to 10 feet immediately adjacent to the project area due to clearing and grading operations. As a result, views looking toward SR 522 in some areas may include more of the roadway. In some areas, exposure to glare generated by construction (illumination, headlights, construction lighting, and solar reflection) may increase with the removal of roadside vegetation.
- Detours, traffic control devices, or lane shifts will require greater driver attention and may distract motorists.
- Temporary clutter (e.g., equipment, workers, debris, materials, signs) may appear in some foreground and background views because of the presence of construction activities.

However, WSDOT does not expect construction to affect most views. Any effects would be short-term.

12 Will construction affect public services and utilities?

The most noticeable effect will be the potential interruption of services and utilities to residents and businesses in the project area. These interruptions will be scheduled and intermittently related to localized construction activities. If construction were to unexpectedly damage the utility infrastructure, interruptions could last for an unknown duration.

Utilities known to abut or cross the SR 522 corridor include buried and aerial power cables, cable TV lines, sanitary sewer and water main lines, natural gas lines, and telephone lines. WSDOT will verify utility locations and plans with permit and franchise holders during final design. If relocations are necessary, WSDOT will coordinate with the providers to relocate the utility in accordance with state law.

Public service providers that may be affected by the project include law enforcement, fire and emergency medical response, public transit, school transportation, and garbage/recycling vehicles. Delays and possible detours associated with construction (described in Question 7, How will construction affect traffic?) have the potential to affect the response times for emergency personnel and cause some rerouting of services. However, most of the SR 522 improvements will occur on state-owned right-of-way and therefore will have little direct effect to service providers.

13 How will construction affect the community, neighboring residences, and businesses?

The community, neighboring residences, and businesses will experience the construction traffic, noise, and visual impacts described above.

14 Will construction affect environmental justice populations?

Low-income and minority people will experience the same potential impacts as described above. No disproportionate adverse impacts to these populations will occur (that is, low income and minority populations will not incur impacts of a greater magnitude or frequency than the community as a whole).

15 Will construction expose people or the environment to hazardous materials?

WSDOT has prepared a Hazardous Materials Discipline Report for the properties outside the existing right-of-way that must be acquired for road widening or stormwater facilities to

determine the likelihood of encountering contaminated soils or groundwater during construction (Parametrix 2008). Based on this assessment, WSDOT finds it unlikely that contaminated soils or groundwater will be encountered during construction.

16 Will construction affect historic, archaeological, or cultural resources?

In a 2005 study, the nearest identified historic resources to construction activities are the Anderson Farmstead, located west of the bridge crossing, and the barn in Lord Hill Regional Park, located east of the bridge crossing. Both resources may be eligible for listing in the National Register of Historic Places, the Washington Heritage Register, or the Snohomish County Local Register of Historic Places (LAAS 2005).

However, construction will be more than 300 feet away from the Anderson Farmstead and 1,000 feet away from the barn in Lord Hill Regional Park, so construction vibration and noise effects will be negligible.

No archaeological resources were identified during field reconnaissance in the project area, and no traditional cultural places were identified through tribal consultation (LAAS 2005; WSDOT 2007d). However, during construction, the contractor may uncover previously unidentified resources. Portions of the project area on the Snohomish and Skykomish River floodplains or level areas above and directly adjacent to the floodplains have a moderate to high probability for archaeological resources. There is also a low to moderate probability for ethnobotanical resources to be found in the project area.

17 How will construction affect water quality in surface waters and groundwater?

Surface water and groundwater quality may be temporarily affected during construction because of the presence of construction equipment and materials, the required earthwork, and the work over and in the Snohomish River. However,

Question 6 in this chapter discusses the BMPs that would be implemented during construction.

BMPs will be in place to protect the water quality, as described in Question 6 of this chapter.

Several types of construction equipment and vehicles, such as earth-moving equipment, dump trucks, pile driving equipment, concrete trucks, and cranes, will be used to build the project. Fuel and oil from this equipment may be spilled or leak to project area surface water or groundwater. As part of the BMPs, WSDOT will require the construction contractor to locate secure, contained refueling areas away from surface waters and implement maintenance and monitoring measures to reduce the potential for spills and leaks. In addition, the contractor will be required to develop and implement a spill prevention and containment plan.

If BMPs are not in place, exposed soils and fine sediments from construction of culverts, retaining walls, and other features may get into surface waters through erosion and stormwater runoff. WSDOT will require the construction contractor to minimize the amount of stockpiled material and locate stockpiles away from surface waters. As part of the BMPs, mulching, matting, and netting; filter fabric fencing; quarry rock entrance mats; sediment traps and ponds; temporary stream bypasses; or surface water interceptor swales and ditches may be used to protect surface waters.

Question 3 in this chapter discusses construction of the Snohomish River Bridge and work that will be done in the river.

Long-term water quality impacts are not expected if BMPs are properly implemented, monitored, and maintained during construction. However, even with BMPs, some short-term water quality impacts from sediment are possible. Therefore, in addition to BMPs, a Temporary Erosion and Sediment Control (TESC) plan will be in place to minimize potential discharges during construction. A TESC plan considers the construction schedule, site conditions, the listing of BMPs, as well as a timeline for installing and maintaining them. WSDOT will include and clearly label BMPs on the appropriate plan sheets. Sensitive environmental areas such as steep slopes, wetlands, and streams will also be identified. The project construction office will update the plan as changes are identified to respond to local conditions.

In addition to potential water quality effects, construction may also temporarily alter the flow of groundwater. For example, temporary piles that are driven into the ground to provide a framework for bridge or wall construction may act as a slight obstacle that groundwater must flow around. Another construction activity that may temporarily alter groundwater flow is dewatering to allow subsurface construction in a dry environment, most likely necessary around bridge footings and retaining walls. These alterations will be temporary.

18 How will construction affect vegetation, wetlands, wildlife, and fish?

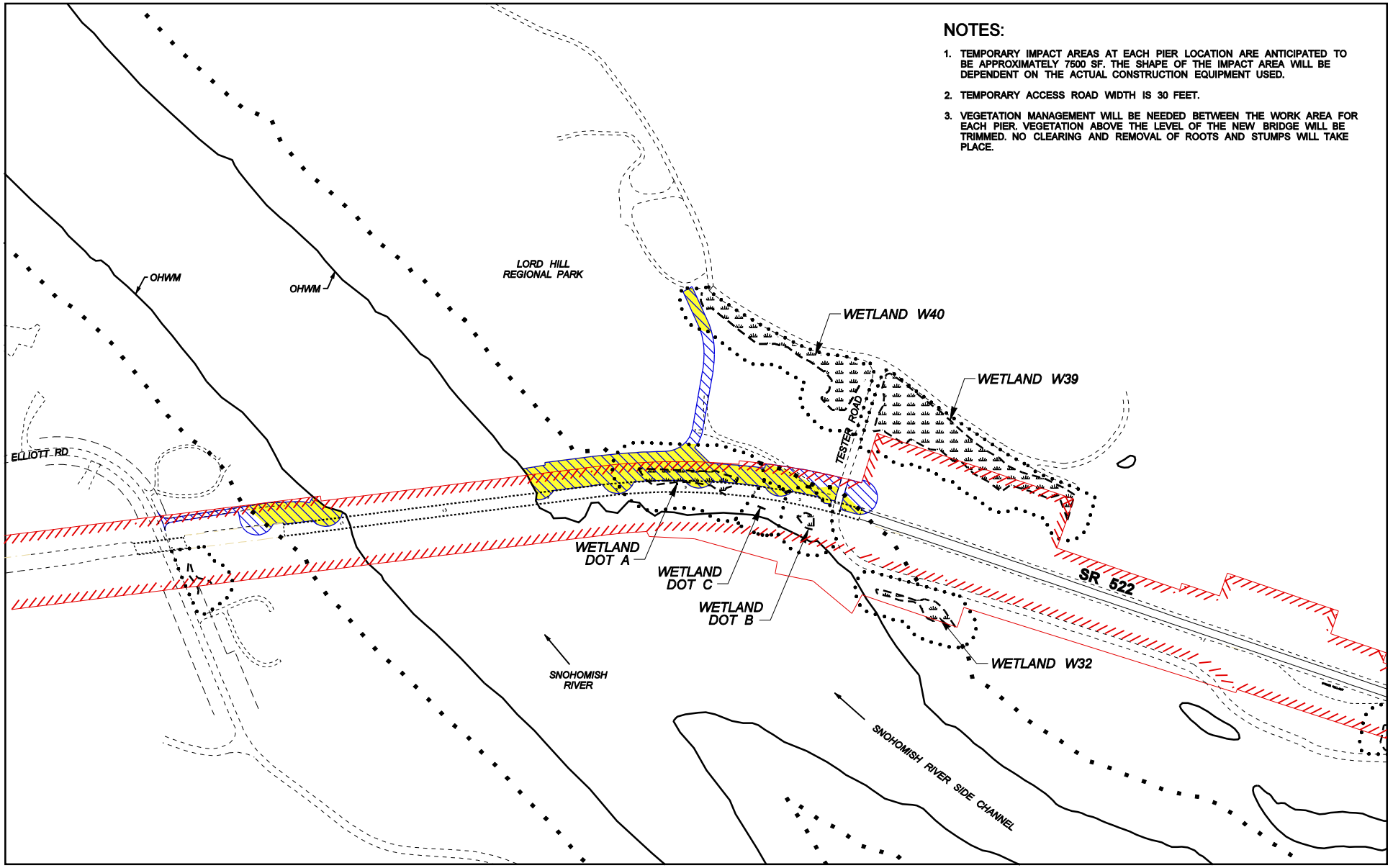
Construction will require the temporary clearing or disturbance of vegetation, wetlands, and aquatic areas for construction access. Construction may also generate noise and activity levels that will disturb wildlife occurring in the area. In addition, these resources may be negatively affected by reduced water quality and altered water quantity.

Construction Access

Temporary clearing or disturbance of vegetation will likely be limited to an area within 5 to 10 feet of the project footprint, the area of the access road to the Snohomish River, an approximately 7,500-square-foot area around each new bridge pier within the floodplain, and the areas needed for staging. Approximately 120,000 square feet of vegetation will be removed or disturbed for construction of the bridge, affecting wetlands, wetland buffers, and the river buffer (Exhibit 4-3).

The Wetlands Discipline Report (Parametrix 2007g) contains more information about temporary impacts to wetlands.

Based on a preliminary impact analysis, an estimated 23 wetlands and/or their associated buffers, or an approximate total of 0.5 acre of wetlands and 1.5 acres of wetland buffers, will be affected by temporary fill or vegetation clearing during construction. Any wetland or buffer areas that are temporarily disturbed will be revegetated with native plants following construction. The impacts to the area within 5 to 10 feet of the project footprint will be the result of construction equipment moving over vegetated areas, primarily areas of grass or herbaceous vegetation. Such damage will be temporary, and vegetation will be replanted in the affected areas.



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Legend:

- Project Right of Way
- Project Limited Access Right of Way
- Existing roads
- Wetland
- Wetland Buffer
- Stream Buffer
- Approximate Temporary Impact Areas
- Approximate Temporary Impact to Critical Areas and Buffers

Exhibit 4-3

Temporary Impacts to Critical Areas

It is estimated that the temporary access to the bridge area will require removal of at least 50 to 100 deciduous trees over 6 inches in diameter near the Snohomish River. This will not be expected to substantially affect riparian functions or reduce the availability of bald eagle perch trees. After construction is complete, the temporary roads, work areas, and staging areas will be decommissioned and revegetated with native plants. WSDOT will encourage the use of ethnobotanical species, as appropriate. To mitigate for the loss of trees larger than 6 inches in diameter from riparian buffer areas, WSDOT will plant replacement seedlings at a ratio of 1:1 or greater.

What are ethnobotanical resources?

Ethnobotanical resources are plants and lichens that have traditionally been used by various cultures in western Washington. Traditional uses include food, medicine, fibers, textiles, and building materials.

Approximately 1.04 acres of stream buffer will be temporarily affected by construction activity. These areas will be replanted with native vegetation, including shrubs and trees.

The temporary work trestle for building the new bridge will temporarily reduce the amount of fish migration habitat in the Snohomish River by approximately 700 square feet. The migration of fish may also be slightly altered due to the presence of the trestle. However, no substantial alterations to fish migration are expected because of the following:

- The piles will be in place a relatively short duration (3 months during two construction years, 6 months maximum).
- The piles will be less than 3 feet in diameter.
- The river is over 500 feet wide at this location.
- The river at the bridge location has a uniform depth, flow, and habitat.

In addition, the work window for installation of temporary piles will be seasonally limited by permit terms and conditions, expected to be from July 1 to August 31. This in-water work window will reduce the exposure of salmonids, including listed and proposed species, to altered habitat conditions. Although the temporary work trestle deck will temporarily increase shading within the Snohomish River, these impacts will be

minimal and not of a magnitude to alter fish behavior or increase predation.

Noise and Human Activity

Noise and human activity associated with construction work may disturb sensitive fish and wildlife species and temporarily alter habitat use. Construction activities that will likely generate the greatest noise disturbance include pile driving associated with construction of the temporary work platform in the Snohomish River and blasting associated with excavation of the new westbound lanes of the SR 522 corridor. Noise generated from pile driving and blasting will decrease to ambient noise levels approximately 4,000 feet from the location of these activities (WSDOT 2006b). Other noise sources will include standard construction equipment such as dump trucks, backhoes, graders, pavers, and other machinery.

To avoid noise impacts to bald eagles, WSDOT will limit construction activities in the following manner:

- No pile driving will occur within 1 mile of an active nest or during the bald eagle wintering season (October 31 through March 31). Pile driving will occur only at the Snohomish River Bridge, which is more than 1 mile from the nearest known bald eagle nest site.
- Blasting will be limited to the months of September and October, outside the nesting season and wintering period.

Only pile driving is expected to generate noise that will affect fish. Impact driving of piles in water produces noise, vibration, and sound energy or pressure within the water column. The vibration can potentially liquefy the soil surrounding the piles (WSDOT 2007f). Impact hammer driving of steel piles can produce sound pressure levels sufficiently high to injure or kill juvenile fish in some conditions. Because fish species are known to occupy the Snohomish River, sound energy associated with impact pile driving may negatively affect these species. To reduce the noise and sound pressure effects to fish species, WSDOT will require the contractor to employ a minimization BMP, such as a bubble curtain or other sound

attenuation measure. As previously stated, all in-water pile driving will be seasonally limited by permit terms and conditions. The work window, expected to be from July 1 to August 31, will reduce the exposure of salmonids, including listed and proposed species, to project effects.

WSDOT typically strives to maintain a 25-foot distance between work areas and active nests of migratory bird species. The new bridge across the Snohomish River will be approximately 5 feet from the existing bridge, which supports nests of cliff swallows. To protect nesting swallows from harm, WSDOT will position exclusion devices before the beginning of the nesting season to prevent swallows from nesting on the existing bridge.

Water Quality and Quantity

The erosion, sedimentation, leaks, and spills that negatively affect surface water and groundwater quality may also negatively affect fish and fish habitat within project area streams and the wildlife that use the streams. For example, a blanket of fine sediment in streams will diminish the amount and kind of food available to fish and reduce gravel areas available for spawning. Thus, the BMPs identified to protect water quality will also reduce the impacts to fish and wildlife. In addition to the BMPs previously identified, WSDOT will require that the contractor:

- Prohibit construction equipment from entering below the ordinary high water mark of project area streams, except where allowed by permit.
- Divert streams prior to culvert work. Adhere to permit terms and conditions, remove fish within the diverted reach, and prevent fish from moving into the work area. If required by the HPA permit, a WSDOT biologist will monitor the removal and transfer of fish to a new channel. (The two culverts associated with salmonid-bearing streams are shown in Exhibit 2-8.)

- Limit construction activities within the ordinary high water mark of project area streams seasonally as stipulated in permit terms and conditions.

Likewise, if construction temporarily alters the flow of groundwater through the area, wetlands, fish, and wildlife may be indirectly but temporarily affected. However, the changes in flow are not expected to be measurable.

19 How will construction affect floodplains?

WSDOT will stabilize the construction access road to the Snohomish River Bridge and its piers, which is located in the floodplain, with quarry spalls or similar stable materials that should not move if the area becomes flooded. Any equipment or materials staged in the floodplain will likely be moved prior to high-flow events.

20 How will construction affect public lands?

The 30-foot-wide access road needed to construct the left bank piers of the new bridge will occur in Snohomish County's Lord Hill Regional Park. Although Lord Hill Regional Park is a Section 4(f) resource, the temporary occupancy of the park for the construction and removal of the temporary access road will not constitute a Section 4(f) "use," based on federal guidelines (FHWA March 2005 Section 4(f) Policy Paper, question 1C) and criteria provided in federal regulations (23 CFR 771.135 (p)(7)). The Section 4(f) Application Determination from FHWA and correspondence with Snohomish County are provided in Appendix I.

Construction Mitigation

21 How will construction BMPs avoid and reduce the potential for project impacts?

The construction BMPs discussed in this chapter will prevent sediment, debris, and contaminants from entering project area waters. WSDOT will require its contractor to implement and monitor such BMPs to protect project area waters. The following BMPs are examples of such measures:

- Minimize the potential for erosion by balancing cuts and fills to the extent feasible, hauling all excess material that cannot be used for fill off-site for disposal in an approved facility, and limiting and clearly marking the area of construction disturbance.
- Minimize construction activities, such as staging, stockpiling, and refueling, near wetlands and streams; prohibit construction activities within the boundaries of these features unless allowed by permit.
- Prevent leaks and spills from construction equipment and vehicles by daily inspecting and repairing those operated near project area waters and by cleaning equipment prior to operation within project area waters.
- Prevent sediment-laden stormwater runoff from entering project area waters by using mulch, matting, and netting; filter fabric fencing; quarry rock entrance mats; sediment traps and ponds; temporary stream bypasses; or surface water interceptor swales and ditches.
- Reduce the risk of contaminants entering project area waters by developing and implementing a spill prevention and containment plan and by having the necessary materials on site prior to and during construction.
- Stabilize the construction access road to the Snohomish River Bridge and its piers, which is located in the floodplain, with quarry spalls or similar stable materials that should not move if the area becomes flooded.

WSDOT will require the construction contractor to implement measures during the bridge construction to prevent contaminants or debris from entering the Snohomish River. For example, concrete pours for the center pier will be contained inside a steel casing, preventing wet or curing concrete from entering the river. Water displaced by the pours will be pumped into a Baker tank or settling pond for treatment and disposal. During construction of the roadway deck and barrier, which will be cast-in-place concrete on top of the steel superstructure,

forms will be sealed with foam to prevent leakage of any cement residue into the water.

By employing and properly maintaining these BMPs, WSDOT will avoid or minimize construction effects to project area wetlands and streams, as well as the fish and wildlife that occur in or use these waters.

22 How will seasonal limitations or other schedule restrictions on construction avoid and reduce the potential project impacts?

Blasting

By limiting the blasting of rock outcrops to the months of September and October, WSDOT will avoid potential noise impacts to bald eagles during the nesting and wintering seasons. WSDOT will further limit blasting to occur during non-peak traffic hours to reduce traffic disruptions.

Work in the Snohomish River

By limiting in-water work within the Snohomish River to July 1 to August 31, WSDOT will avoid pile driving during the bald eagle wintering season and reduce the exposure of salmonids, including listed and proposed species, to project effects. Although the removal of the temporary work trestle will occur in September, WSDOT will vibrate out the piles to minimize the effects. Removal of the temporary work trestle will occur before September 30.

Work in Other Project Area Streams

By limiting in-water work for culvert replacements on streams to the in-water work window specified by the HPA, WSDOT will reduce the potential exposure of salmonids to project effects.

Clearing and Grading

By limiting the amount of clearing and open grading that will occur at any one time, based on WSDOT standard specifications, permit requirements, and weather conditions, WSDOT will minimize the potential for erosion and sedimentation.

23 What measures are proposed to mitigate construction noise?

Several methods will be used to limit the effects of construction noise. All engine-powered equipment will be required to have mufflers installed according to the manufacturer's specifications, and all equipment will be required to comply with pertinent noise standards of the U.S. Environmental Protection Agency.

If specific noise complaints are received during construction, the contractor may be required to implement one or more of the following noise mitigation measures, as directed by the project manager:

- Locate stationary construction equipment as far from nearby noise-sensitive properties as possible.
- Shut off idling equipment.
- Reschedule construction operations to avoid periods of noise annoyance identified in the complaint.
- Notify nearby residents whenever extremely noisy work will be occurring.
- Install temporary or portable acoustic barriers around stationary construction noise sources.

Finally, because of the local noise ordinance, construction activities outside the hours of 7:00 a.m. to 10:00 p.m. on weekdays and 9:00 a.m. to 10:00 p.m. on weekends may require a noise variance or a noise exemption.

24 What mitigation measures will be in place to protect cultural resources?

A professional archaeologist will monitor ground-disturbing activities in native soils in areas with a moderate to high probability for archaeological resources.

WSDOT will develop an inadvertent discovery plan to identify procedures in the unlikely event that historic period archaeological deposits or human remains are inadvertently discovered during construction excavation in any portion of the

proposed project. The plan will be incorporated in contract construction documents and will include procedures such as the following:

- WSDOT will immediately halt ground-disturbing activities and secure a perimeter of not less than 30 feet to maintain the integrity of the deposits.
- WSDOT will then notify the county sheriff, coroner, FHWA, the Department of Archaeology and Historic Preservation, the Duwamish Tribe, the Snohomish Tribe of Indians, the Snoqualmie Tribe, the Tulalip Tribes, and the Yakama Nation.
- Treatment of the archaeological deposits or human remains will be coordinated through consultation among these parties.

WSDOT may notify the Tulalip Tribe of the pre-construction schedule and opportunity to harvest native plant materials once the General Permit for the Removal of Materials from State Lands per Executive Order D 26-65 is obtained.

25 What other mitigation measures will WSDOT implement?

Communication Updates

WSDOT will communicate with the local community and motorists using SR 522 to inform them of the construction activities. The communications will mitigate potential traffic impacts by giving advance notice of any lane or shoulder reductions or roadway closures.

Utilities

WSDOT will verify utility locations and plans with permit and franchise holders during final design. All existing utility locations will be shown on the construction plans. Utility providers will be given advanced notice of construction activities. If relocations are necessary, WSDOT will work with the providers to relocate the utility in accordance with state law. In addition, the contractor will verify utility locations as required by law prior to any excavation work.

Public Services

WSDOT will coordinate in advance with emergency services, law enforcement, public service providers, and schools regarding planned detours and delays. WSDOT will fully explain the project and familiarize them with the construction traffic plan that will be used. Additionally, WSDOT's project websites that report construction activities and the main SR 522 project website will be regularly updated to provide information regarding construction activities and how drivers, residents, and businesses will be affected. Road closures and detours will be prominently signed, and notice of changes will be widely distributed to media covering the project area.

WSDOT will coordinate with local emergency responders to ensure priority access for emergency and law enforcement vehicles.

Local Traffic Access

WSDOT and its contractor will work together on the construction timing and sequencing to ensure the maximum access through and around the project area during construction. Some construction may be timed to avoid, as much as possible, the primary business hours at certain locations and special events such as the Evergreen State Fair. WSDOT will meet with individual businesses, City of Monroe, and Snohomish County, as needed, to develop a plan that minimizes construction disruptions.

The contractor will develop a traffic control plan that conforms to the established standards in the *Manual of Uniform Traffic Control Devices, Part VI* as well as any hour and/or date restrictions stipulated by WSDOT.

Pedestrian Access

WSDOT will develop pedestrian detours around work areas along US 2 and 164th Street SE. WSDOT will maintain pedestrian traffic on one side of 164th Street SE, especially during the school year. To facilitate such a detour, construction of the new sidewalk on the north side of 164th Street SE may

be an early construction activity to maintain pedestrian access during the construction of the remainder of the roundabout.

Vegetation

WSDOT will minimize the area disturbed by construction to limit the amount of soil exposed and vegetation removal. Temporary clearing or disturbance of vegetation will likely be limited to an area within 5 to 10 feet of the project footprint, the area of the access road to the Snohomish River, the work area depicted on Exhibit 4-1, and the areas needed for staging.

Following construction, WSDOT will restore the roadside area to prevent erosion of exposed soils, enhance wildlife habitat, and increase driver comfort. Any wetland, stream, or buffer areas that are temporarily disturbed during construction will be restored to their original function.

Erosion control blankets may be used to assist in the rapid revegetation of sites disturbed by culvert replacement.

After construction is complete, the temporary roads, work areas, and staging areas will be decommissioned and revegetated with native plants. WSDOT will encourage the use of ethnobotanical species, as appropriate.

Hazardous Materials

WSDOT will specify in the construction documents that the contractor will avoid releasing or spreading any contaminated soil or groundwater encountered during construction. If excavation or dewatering of contaminated material is necessary, the contractor will properly segregate and contain the material during and after excavation and dewatering and will test the material to determine how it can be disposed of. The contractor will handle and dispose of the material in accordance with applicable regulations.

Noise Measures for Fish and Wildlife

To reduce the noise and sound pressure impacts to fish species, WSDOT will require the contractor to employ a minimization BMP, such as a bubble curtain or other sound attenuation measure.

No blasting or pile driving will occur within 1 mile of an active bald eagle nest or during the bald eagle wintering season (October 31 through March 31).

Other Measures for Wildlife

To protect nesting swallows from harm, WSDOT will position exclusion devices before the beginning of the nesting season to prevent swallows from nesting on the existing bridge.

To reduce the risk of entrapment, WSDOT will incorporate escape features into the design of the exclusion fencing near the wildlife crossing structure. WSDOT will also attempt to discourage deer from circumventing the exclusion fences by placing fences adjacent to the road shoulder where practical, thereby allowing access to the grassy vegetation along the right-of-way.

Views

To reduce the temporary visual effects during construction, the project will minimize the removal of existing vegetation and locate storage and staging areas in places that are not visually prominent to the extent practical. The contractor will address light and glare associated with nighttime construction activities by using downcast lighting sources.